KEISOKU GIKEN

Operation Manual

Ripple Noise Scanner

SC-83

KEISOKU GIKEN CO., LTD.

Warranty

This product has passed our strict product inspection.

If the initial purpose and specifications are not met due to a failure within one year after delivery, and the cause is our manufacturing responsibility, we will repair it free of charge. Contact the dealer where you purchased the product or us. We will repair it in our factory. However, in the following cases, this warranty is not applied and we will repair it for a fee.

1. In case of failure or damage caused by handling contrary to the usage and precautions described in the instruction manual of this product.
2. When modified without our approval.
3. In the case of failure or damage caused by improper handling by the customer, for example, dropping, impact, etc. during transportation
4. In the case of failure or damage due to a natural disaster such as a fire, earthquake, or flood.
5. In case of failure / damage caused by abnormal input voltage.
6. When a repair technician is dispatched.

This warranty is valid only in Japan.

Copyrights

Read this manual before start using this product

This document describes the SC-83 Ripple Noise Scanner.
Please read this manual carefully before using this product.
This manual should be kept in an accessible place.
Attach this manual to this product when you relocate them.

This manual is written based on the functions of this product when shipped from KG.
The specifications are subject to change without any notice.

For your Safety Usage

For your safety reasons, you are requested to read this manual thoroughly first. Keisoku Giken shall not be responsible for any accidents which resulted from your improper use or something like that.

Danger Warning Label

This symbol indicates warnings, dangers, or cautions. If this symbol is displayed on this product, refer to the relevant section of this manual.

This symbol means Careful for Handling.
It is suggested to read manual to know how to protect operator and product itself against risk of damages.

Warning

This term indicates the possibility of causing serious damages to an operator.

Caution

This term indicates the possibility of causing serious damages to an operator.

This term indicates a prohibited act.

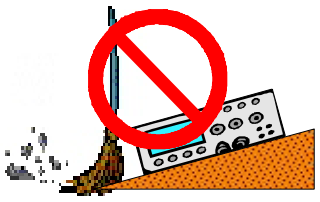
Note

This term indicates what you want to know of product performance or operation method.

Installation environment

Do not use in inflammable and corrosive gas environment.
Avoid using it in strong electromagnetic environment. Under a strong electromagnetic field environment, the noise induced in the input cable is measured as an input signal due to the characteristics of the instrument, so the measured value may be affected.

Avoid locations that are hot or in direct sunlight. Use under the specified ambient conditions. In case of condensation, please do not use this product until completely dry. Avoid places with high humidity.

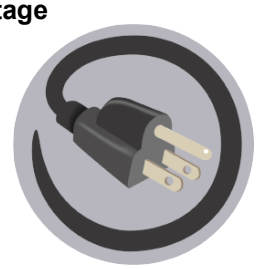


Do not use the product where there is too much dust or grit.
Do not use the product with poor air circulation. The product uses forced cooling. Ensure that adequate space is available around the product so that its intake port and exhaust outlet are not blocked.
Ensure to use the product after placing it in horizontal position.
Do not use on an inclined or vibrating place.

■ **Dismantling**

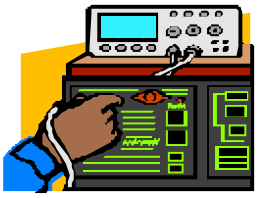
Some of the parts inside the product uses high voltage that may be hazardous for human body. Do not remove cover or panel.

■ **Input voltage**



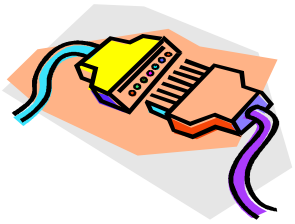
Be sure to use the input power supply voltage of this product within the rated range.
Use Power Cable which is suitable for your own country's safety standard.

■ **User**



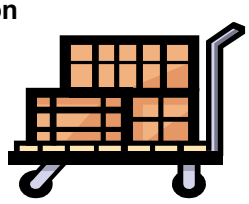
This product shall be used by personnel with adequate knowledge of electrical concepts.
Users without adequate knowledge of electrical concepts should use the product under the supervision of a knowledgeable person.

■ **Connection / removal**



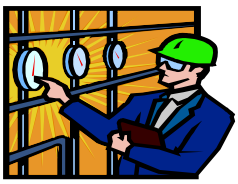
Before connecting cables and devices, be sure to turn off the power switch of each device.

■ **Transportation**



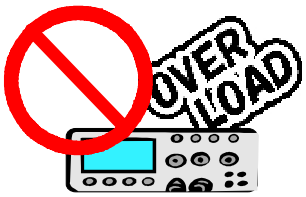
Move the product only after turning OFF the power supply and removing all wiring cables.
Attach the instruction manual when moving the product.
When transporting the product, use the special packing material supplied with the product. If you do not have the special packing material, adequately protect the product with shock-absorbing material.

■ **Maintenance and inspection**



In order to prevent electric shock when performing maintenance or inspection, ensure to remove the plug of power cord set.
Periodic maintenance, inspection and cleaning of the product is recommended for maintaining its safety.
Periodic calibration is recommended for maintaining the performance of the product.

■ **Overload**



Do not apply voltage outside the specified range in connectors and input terminals of the product.
Do not use connectors and input terminals of the product except for applications described in this manual.

■ **Calibration, Repair**

Calibration and repair of the product is handled by KEISOKU GIKEN Co.,Ltd.
In the event calibration or repair is required, please contact us or our agent.

Check when you unpack

After you unpack, please check if the product suffers any damages and all the accessories are duly provided.
Should you find any damages and missing accessories, please contact dealer you purchased from or KG directly?

Accessories

The following accessories are included in this product.

Product name	Model name	quantity
Connector	57-30240	1
Coaxial cable	BPK1W-58	1
Power cable (with 3-pole plug)	Power cable	1
CD-ROM (Operation Manual)	M-2531	1

Note When you unpack, check the product and all the accessories.

- Check if the product suffers any damages.
- Check if all the accessories are duly provided.

Precautions when moving

Observe the following precautions when moving the product.

Warning **Risk of electric shock.**

- For your safety, be sure to turn off the power switch when moving.
  Even if the power is turned off, the voltage may remain in the device.
  Make sure that the voltage has dropped before starting work.

Caution It may damage the equipment.

- When transporting this device, use the dedicated packing material (packing material at the time of delivery).
- If you do not have a dedicated packing material, be sure to use the same or better packing material.

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Chapter 1. Introduction

Overview

SC-83 is a channel switching scanner dedicated to Ripple & noise meter RM-104.
When measuring Ripple & noise of switching power supply, you can switch signals of multiple channels.

You can switch between 8-channel input by digital I / O or manually, and you can switch up to 16-channel input by connecting another SC-83.

Note By connecting one SC-83 additionally, you can switch up to 16 channel inputs.

- In the case of "16 channel input switching", all inputs cannot be set to OFF. (One of the inputs will be selected)

When using two SC-83s in a connection, if you purchase an additional SC-83, the optional dedicated cable SCSC-05 is required separately.

Features

(1) Wide frequency band:
DC to 50 MHz (-2.0 dB TYP) for each channel
DC to 100 MHz (-4.0 dB TYP) for each channel

(2) High common mode noise rejection ratio
30 dB or more between DC and 50 MHz for each channel

(3) Easy channel switching control
When controlling with digital I / O, you can switch between channel by bit or binary code. No external power supply is required when controlling with a photocoupler.

Precautions for use

1) Precautions when wiring

Wire correctly so that you do not mistake the input and output. If you make a mistake, it may cause a malfunction.
Be sure to remove the input wiring before performing work such as wiring.

Connect the power cable using the supplied power cable with a 3-pole plug. If the ground is not properly grounded, the measured value may become unstable.
If you want to use it outside of Japan, please prepare the one (voltage / current) that complies with the laws of the region or country where it is used.

- The device side is IEC 60320 C14 type (male)
- AC power cable side (female) is C13 / C15 type
- The rated current of the AC power cable is 5 A or more

Alternatively, please contact our sales / dealer.

Caution It may damage the equipment.

- The power cable with 3-pole plug allows you to easily disconnect this product from AC power. Make sure there is enough space around the outlet so that you can remove the plug from the outlet in an emergency.

Warning **There is a risk of electric shock.**

- **Before connecting the power cable, turn off the POWER switch on the front panel.**
- **Connect the power plug to an outlet with a grounding electrode.**

1. Turn off the POWER switch on the front panel.
2. Connect the power cable set to the AC inlet on the rear panel.
3. Plug the power cable into an outlet with a grounding electrode.

Warning **There is a risk of electric shock.**

- **Before opening the cover for maintenance, be sure to disconnect the power cable and turn off the power. It may cause electric shock or malfunction.**

2) About installation location

Select a location that avoids high temperature and humidity, dust, direct sunlight, flammable and corrosive gases, and vibration caused by machinery.

3) Installation

Be sure to use it with the bottom side down and level. If you lay it on its side or turn it upside down, it may cause a malfunction.

4) Attention to noise

Do not place any noise-sensitive equipment near this product.

5) Attention to static electricity

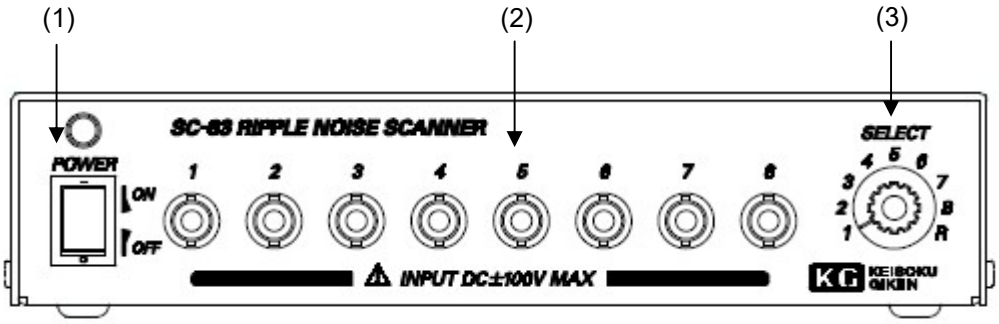
Do not apply static electricity directly to the pins inside the unused connector. It will be the cause of the failure.

6) If the product is out of order

If you think the product is out of order, immediately turn off the power switch and disconnect the input wiring. If left untreated, it may cause a fire.

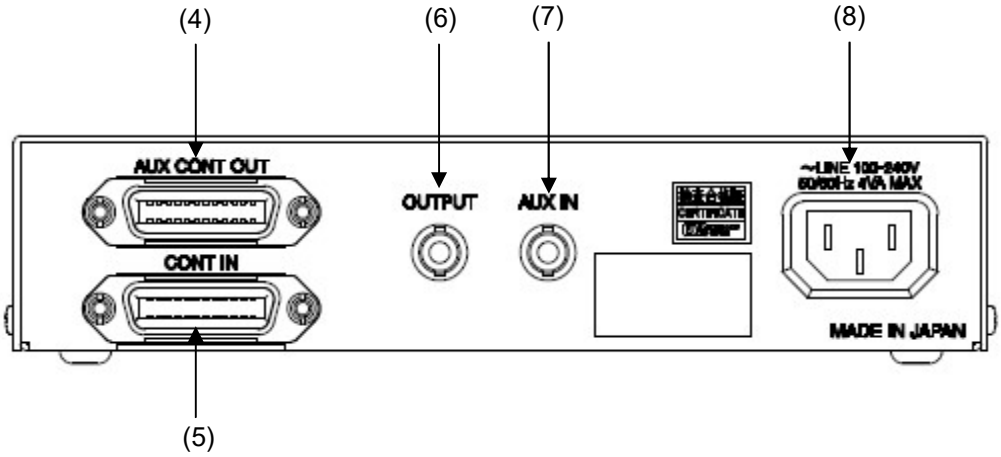
Chapter 2.
Names and functions of each part

Front Panel



(1)	**POWER**	This is the power switch of this unit. When the switch is turned on, the LED lights up.
(2)	**Signal input connector (CH1 to CH8)**	It is a connector for signal input.
(3)	**SELECT**	It is used when switching channels manually.

Rear Panel



(4)	**AUX CONT OUT**	This is an output connector for interlocking control of another SC-83. Connect with CONT_IN of SC-83 to be linked.
(5)	**CONT IN**	This is an input connector for controlling channel switching with digital I / O.
(6)	**OUTPUT**	It is a connector for signal output. Connect a ripple meter or electronic load device (with ripple meter function).
(7)	**AUX IN**	It is a signal input connector when another SC-83 is controlled in conjunction. Connect to the OUTPUT of the SC-83 to be linked.
(8)	**AC 100 V to 240 V**	AC Inlet for connecting the power cable. Rated AC 100-240 V.

Chapter 3. How to control SC-83

For the connection method, refer to "Chapter 5 Connection Method".

When controlling with bits

(1) Set the SELECT switch (rotary switch) to R.

(2) Set the B / C signal of the CONT_IN connector (see "Chapter 6 Connector Pin Arrangement") to High (Open).

(3) When the following signal of the CONT_IN connector is set to Low (Short), the assigned input signal is output.

Signal name	Channel
CONT1	1
CONT2	2
CONT3	3
CONT4	4
CONT5	5
CONT6	6
CONT7	7
CONT8	8
M/S	AUX IN

Note) Two input signals cannot be selected at the same time.

When controlling with binary code

(1) Set the SELECT switch (rotary switch) to R.

(2) Set the B / C signal of the CONT_IN connector (see "Chapter 6 Connector Pin Arrangement") to Low (Short).

(3) If the following signals of the CONT_IN connector are combined as shown in the table, the input signal assigned to the code will be output.

Signal name				Channel
CONT 1	CONT 2	CONT 3	CONT 4	
High	High	High	High	1
Low	High	High	High	2
High	Low	High	High	3
Low	Low	High	High	4
High	High	Low	High	5
Low	High	Low	High	6
High	Low	Low	High	7
Low	Low	Low	High	8
X	X	X	Low	AUX IN

X: Either High or Low can be used.

For the pin layout of the connector, refer to "Chapter 6 Pin Layout of the Connector".

Chapter 4. How to control two SC-83s in conjunction

For the connection method, refer to "Chapter 5 Connection Method".

When controlling with bits

(1) Set the SELECT switch (rotary switch) to R.

(2) Set the B / C signal of the CONT_IN connector on the master side (see "Chapter 6 Connector Pin Arrangement") to High (Open).

(3) When the following signal of the CONT_IN connector on the master side is set to Low (Short), the input signal assigned to each bit is selected and output from the OUTPUT on the master side.

Signal name									Channel
CONT 1	CONT 2	CONT 3	CONT 4	CONT 5	CONT 6	CONT 7	CONT 8	M/S	
Low	High	High	High	High	High	High	High	High	M1
High	Low	High	High	High	High	High	High	High	M2
High	High	Low	High	High	High	High	High	High	M3
High	High	High	Low	High	High	High	High	High	M4
High	High	High	High	Low	High	High	High	High	M5
High	High	High	High	High	Low	High	High	High	M6
High	High	High	High	High	High	Low	High	High	M7
High	High	High	High	High	High	High	Low	High	M8
Low	High	High	High	High	High	High	High	Low	S1
High	Low	High	High	High	High	High	High	Low	S2
High	High	Low	High	High	High	High	High	Low	S3
High	High	High	Low	High	High	High	High	Low	S4
High	High	High	High	Low	High	High	High	Low	S5
High	High	High	High	High	Low	High	High	Low	S6
High	High	High	High	High	High	Low	High	Low	S7
High	High	High	High	High	High	High	Low	Low	S8

Note 1) Two input signals cannot be selected at the same time.

Note 2) M# represents the master side channel and S# represents the slave side channel.

When controlling with binary code

(1) Set the SELECT switch (rotary switch) to R.

(2) Set the B / C signal of the CONT_IN connector on the master side (see "Chapter 6 Connector Pin Arrangement") to Low (Short).

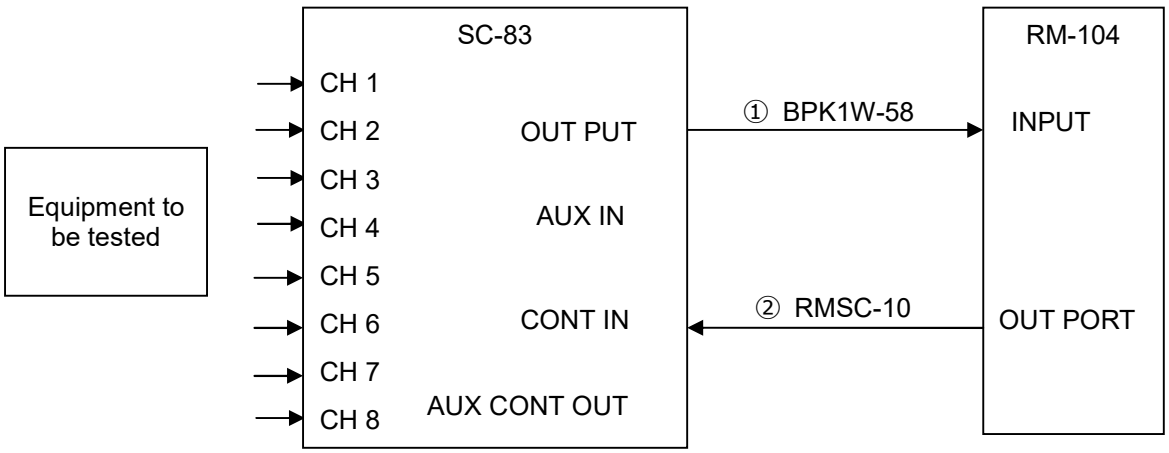
(3) When the signals of the CONT_IN connector on the master side are combined as shown in the table, the input signals assigned to each code are selected and output from the OUTPUT on the master side.

Signal name				Channel
CONT 1	CONT 2	CONT 3	M/S	
High	High	High	High	M1
Low	High	High	High	M2
High	Low	High	High	M3
Low	Low	High	High	M4
High	High	Low	High	M5
Low	High	Low	High	M6
High	Low	Low	High	M7
Low	Low	Low	High	M8
High	High	High	Low	S1
Low	High	High	Low	S2
High	Low	High	Low	S3
Low	Low	High	Low	S4
High	High	Low	Low	S5
Low	High	Low	Low	S6
High	Low	Low	Low	S7
Low	Low	Low	Low	S8

Note) M# represents the master side channel and S# represents the slave side channel.

Chapter 5. Connection method

Connection between SC-83 and Ripple & noise meter

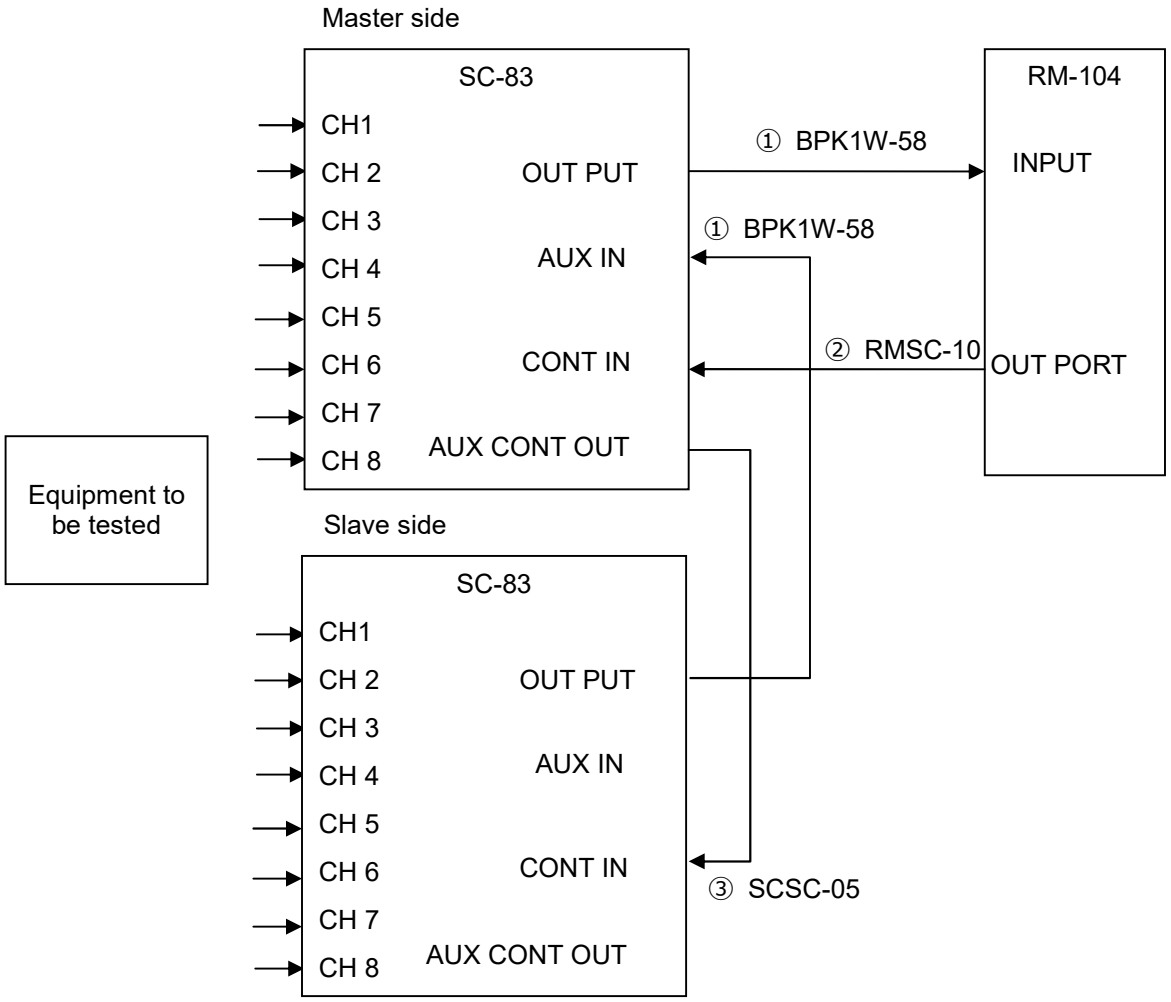


Note About available Ripple & noise meters.

- The SC-83 is compatible with the Ripple & noise meter RM-104 and the older model RM-103.

Connection when using two SC-83 in conjunction

SC-83 can be expanded up to 16 channels by master / slave connection.



① BPK1W-58 (accessory)

A BNC cable that detects noise from the equipment under test.

② RMSC-10 (option)

Ripple & noise is a dedicated connection cable RMSC-10 that connects the "OUT PORT" connector of the meter RM-104 and the "CONT IN" connector of the SC-83.

③ SCSC-05 (option)

This is a dedicated cable SCSC-05 that connects the "AUX CONT OUT" connector on the master side and the "CONT IN" connector on the slave side of the SC-83.

Note About available Ripple & noise meters.

- The SC-83 is compatible with the Ripple & noise meter RM-104 and the older model RM-103.

Chapter 6. Connector pin-out

CONT IN (Connector used 57FE-40240-20S: DDK)

Pin number	name	Details	Pin number	name	Details
1	CONT 1	Control terminal	13	GND	Control terminal
2	CONT 2	Control terminal	14	GND	Control terminal
3	CONT 3	Control terminal	15	GND	Control terminal
4	CONT 4	Control terminal	16	GND	Control terminal
5	CONT 5	Control terminal	17	GND	Control terminal
6	CONT 6	Control terminal	18	GND	Control terminal
7	CONT 7	Control terminal	19	GND	Control terminal
8	CONT 8	Control terminal	20	GND	Control terminal
9	M/S	Master / slave Status setting	21	GND	Control terminal
10	B/C	Bit / binary Code settings	22	GND	Control terminal
11	NC	—	23	NC	—
12	R STATE	Remote (R) state detection	24	GND	Control terminal

Note) NC: No signal (Compatible connector 57-30240: DDK)

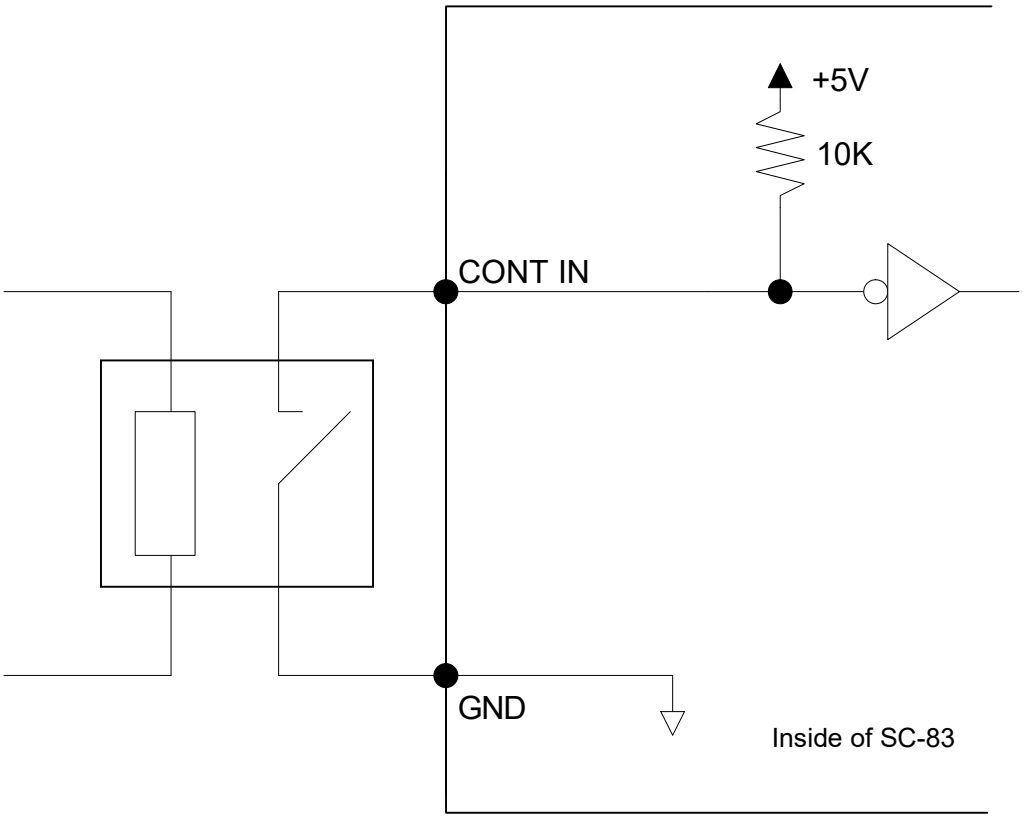
AUX CONT OUT (Connector used 57FE-40240-20S: DDK)

Pin number	name	Details	Pin number	name	Details
1	CONT 1	Control terminal	13	GND	Control terminal
2	CONT 2	Control terminal	14	GND	Control terminal
3	CONT 3	Control terminal	15	GND	Control terminal
4	CONT 4	Control terminal	16	GND	Control terminal
5	CONT 5	Control terminal	17	NC	—
6	CONT 6	Control terminal	18	GND	Control terminal
7	CONT 7	Control terminal	19	GND	Control terminal
8	CONT 8	Control terminal	20	GND	Control terminal
9	M/S	Master / slave Status setting	21	NC	—
10	B/C	Bit / binary Code settings	22	GND	Control terminal
11	NC	—	23	NC	—
12	R STATE	Remote (R) state detection	24	GND	Control terminal

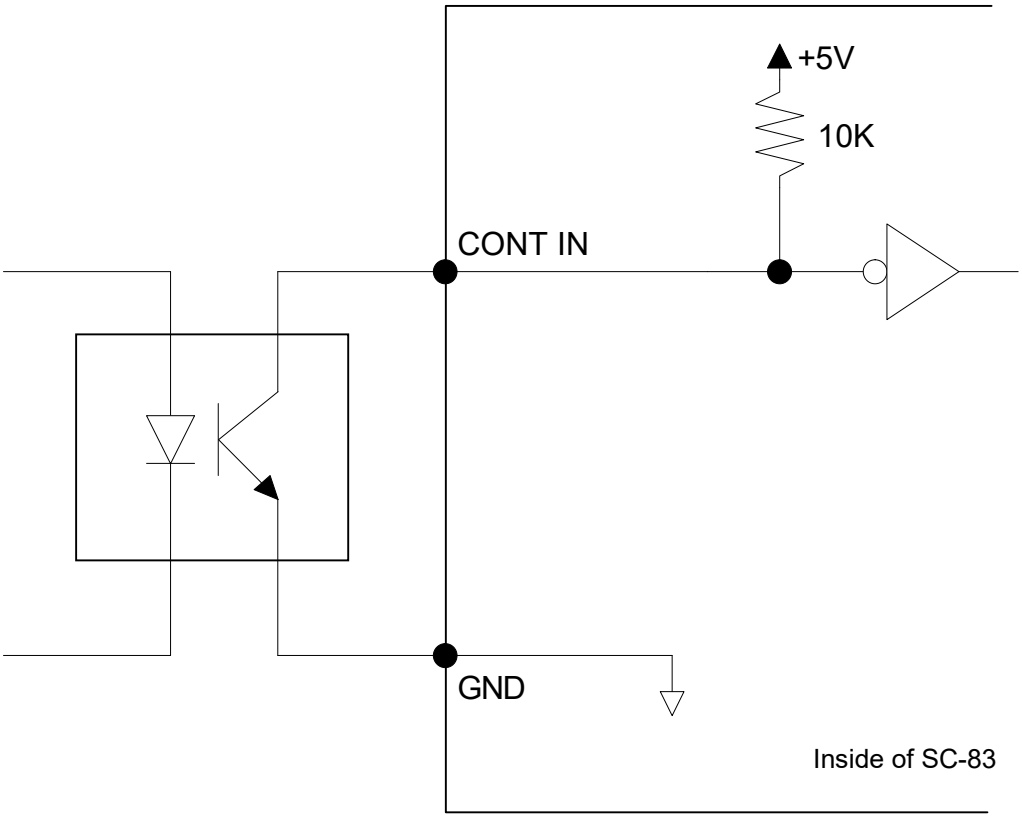
Note) NC: No signal (Compatible connector 57-30240: DDK)

Chapter 7. Connection example of external signal and SC-83

When using a relay



When using a Photocoupler



Chapter 8. Maintenance

Relay replacement

The relay can be replaced during maintenance.
Relay used: DIP-2M-05SN (manufactured by Okita Seisakusho)

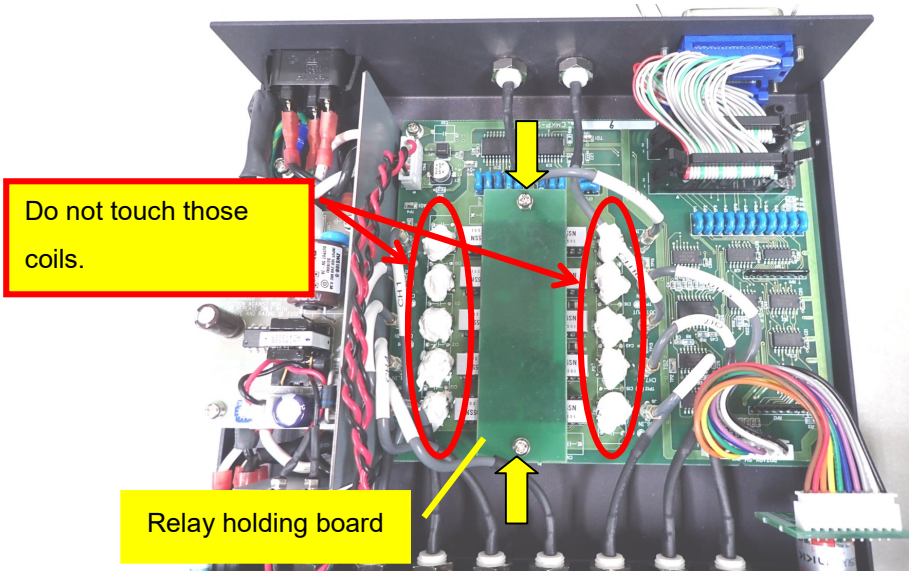
The time to replace the relay depends on the customer's usage conditions and environment.
Chapter 9 Specifications Set by referring to the guideline for relay replacement.

⚠ Warning **There is a risk of electric shock.**

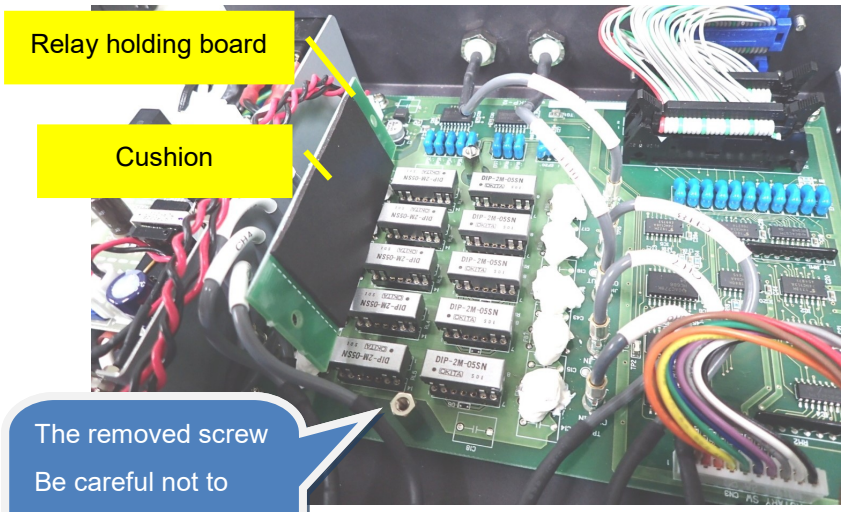
- **Before opening the cover, be sure to disconnect the cables from all connectors and turn off the power.**

1) Remove the four screws on the side of the cover.

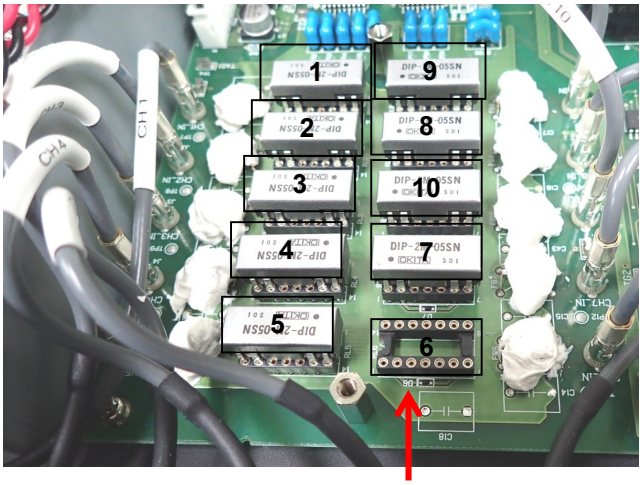
2) Remove the two screws on the relay holding board at the top of the relay.



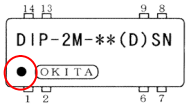
3) Remove the relay holding board and cushion.



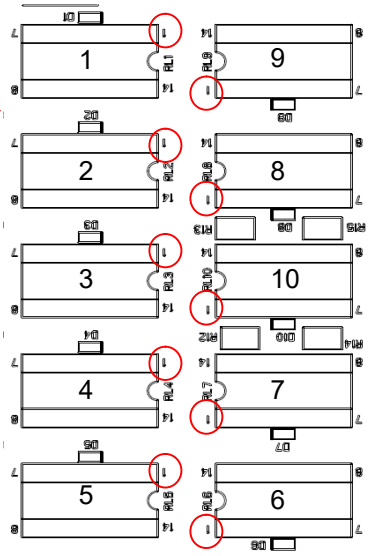
4) Replace the relay.



Be careful not to make a mistake in the direction of the pin numbers.

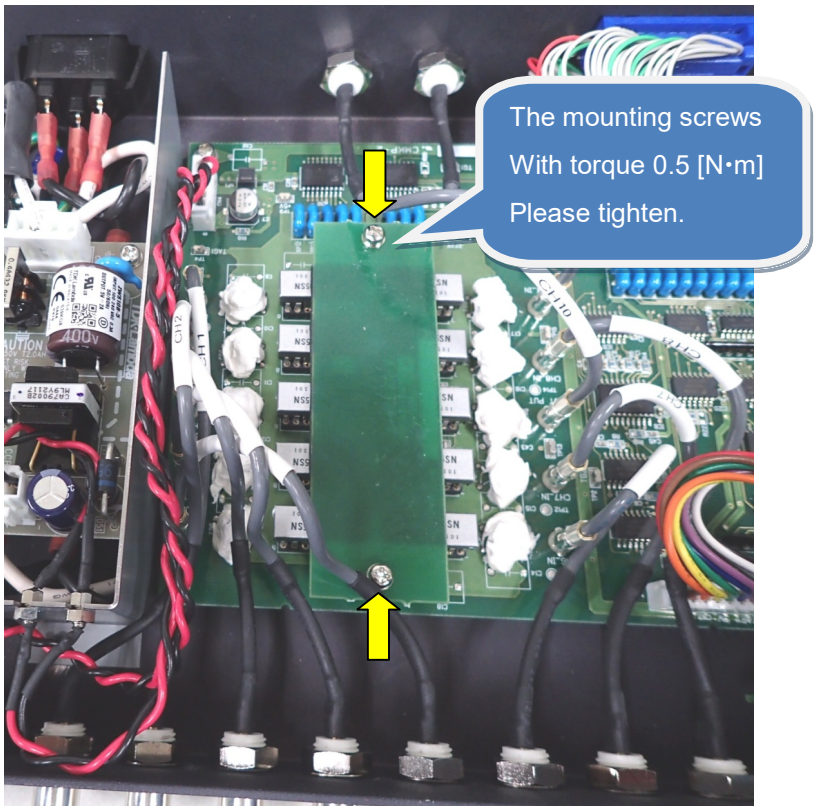


The ○ mark on the No. 1 pin

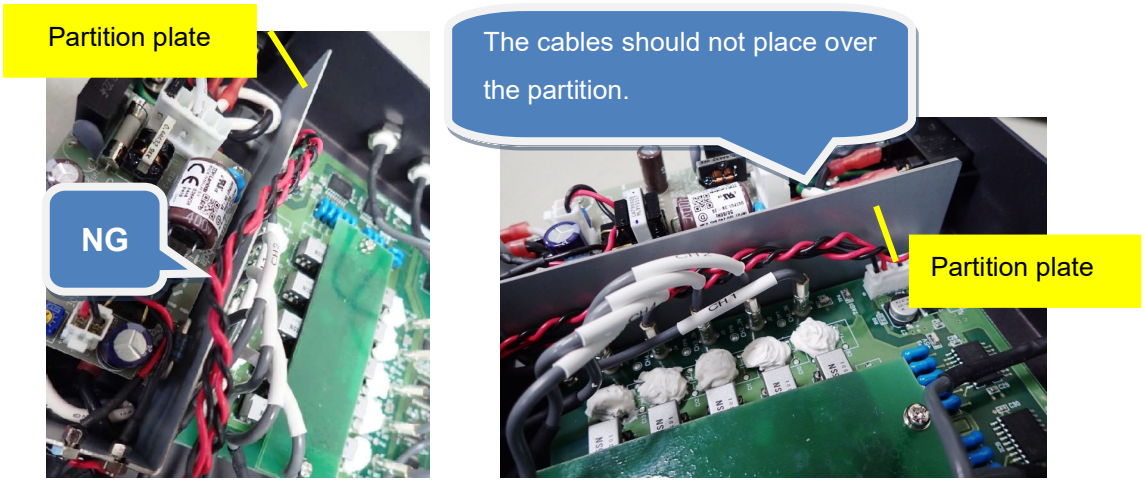


The input CH number and the relay number correspond. For example, if the input voltage of the selected CH5 is not output, the relay 5 may be out of order and needs to be replaced

5) Install the relay holding board with the cushion facing down.



Pull the cables so that they do not pinch the internal cables.



Caution It may damage the equipment.

- If the cable hangs on the partition plate, it is dangerous because it may cut the cable when the cover is attached. Be careful not to pinch the cable.

6) Install the cover and install the four screws on the side.。

What to do if you think it is out of order

- When the LED does not light even when the power switch is turned on
  Turn off the power switch, disconnect all input channel connections, and then check that the power cable is firmly plugged in.
  If the power cable is connected correctly and the LED does not light even when the power switch is turned on, the device may be out of order. Please contact our service.

- When the input cannot be switched from the Ripple & noise meter RM-104 / RM-103
  Make sure that the rotary switch is set to "R".
  With the power switch turned off and the power cable unplugged, make sure that the connection cable between the Ripple & noise meter and the SC-83 is firmly connected.
  If the input cannot be switched from the Ripple & noise meter even if the power cable is plugged in and the power switch is turned on with the connection correct, the remote connection may be defective. Please contact our service.

- When voltage is applied to the input channel but it is not output from OUT PUT
  To check the connection, turn off the power switch and disconnect the power cable. Check that the rotary switch is set correctly.
  Make sure that the CONT IN connector is firmly inserted.
  Make sure that the BNC connector is firmly inserted.
  Each input signal is correct with the rotary switch settings and various connector connections correct.
  There are problems such as not being output from OUT PUT or the value dropping significantly.
  If so, the internal relay may be defective. Replace the relay.
  If only a specific input channel is not output, there may be a problem with the relay with the number corresponding to the specific input channel and the relay with the adjacent number.
  Also, if there is no output from all channels CH1 to CH8, or if the value is very low, there may be a problem with the relay RL10, so replace the relay.

- If the output is not output even after replacing the relay
  The device may be out of order, so please contact our service.

- When two SC-83 units are connected for expansion and the slave side cannot be operated from the master side of the SC-83.
  For both SC-83, check if the rotary switch is set to "R".
  Check if the extension cable SCSC-05 is connected correctly.
  With the correct rotary switch settings and wiring connections, the added input channel
  If you cannot operate it, the device may be out of order, so please contact our service.
  Please contact me.

- When the output voltage is different from the selected input channel
  The device may be out of order, so please contact our service.

- When the output does not switch even if the channel is switched
  The device may be out of order, so please contact our service.

Chapter 9. Specifications

1) Function, performance

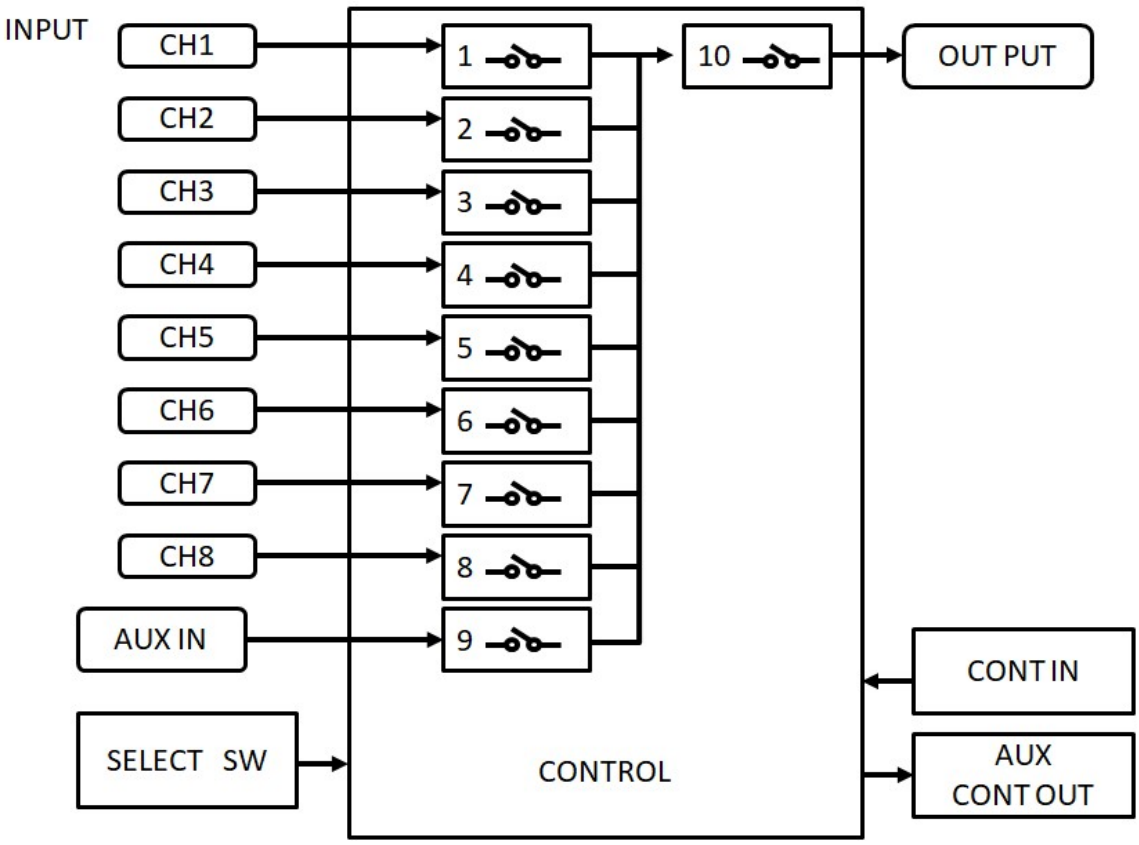
Model name		SC-83
Signal switching unit		
Number of channels		8 channels + AUX. Input Up to 16 channels (Add one SC-83. SCSC-05 cable is required)
Frequency bandwidth	DC ~ 20 MHz	-1 dB（TYP）
	DC ~ 50 MHz	-2 dB（TYP）
	DC ~ 100 MHz	-4 dB（TYP）
Common mode Noise rejection	DC ~ 50 MHz	-30 dB 以上
	DC ~ 100 MHz	-15 dB 以上
Crosstalk	DC ~ 100 MHz	-30 dB 以上
Disconnecting voltage		DC 100 V
Disconnecting current		0.5 A
Contact connection method		Break before Make
Withstanding voltage between signals		DC 100 V
Withstanding voltage between signal and frame		DC 100 V
Control section		
Switching method		Manual and external controls
External control input	Input voltage	0.0 ~ 5.0 V (TTL / CMOS input)
	Switching time	Within 12 ms
	Control	Bit and binary code
	Number of signals	10
General specifications		
Input power supply voltage range		AC 85 ~ 264 V, 50/60 Hz (47 Hz~ 63Hz)
Power consumption		Within 4 VA
Withstanding voltage		AC 1500 V 1 minute (between input and FG, between input and measurement terminal)
Insulation resistance		DC 500 V 30 MΩ or more (between input and FG, between input and measurement terminal)
Altitude		2000 m or less
Cooling system		Natural air cooling
Environmental condition	Installation environment	Indoor, horizontal installation Do not place in hot, humid, dusty, direct sunlight, flammable, corrosive place and near machines generating vibrations.
	Installation posture	Be sure to use it with the bottom side down and level.
	Operating temperature / humidity range	0 ℃ ~ 40 ℃ / 20% ~ 85% RH or less (no condensation)
	Storage temperature / humidity range	-20 ℃ ~ 60 ℃ / 20% ~ 85% RH or less (no condensation)
External dimensions		225 (W) x 49 (H) x 187 (D) mm (excluding protrusions *1)

Mass	About 1.2 kg
Estimated relay replacement	Electrical life: Approximately 5 million times (± 100V 60 times / minute, ambient temperature 23 °C)
	Mechanical life: Approximately 100 million times
	* The relay can be replaced by the user.
Noise	Do not place any equipment that is susceptible to noise.
Static electricity	Do not apply static electricity directly to the pins inside the connector.

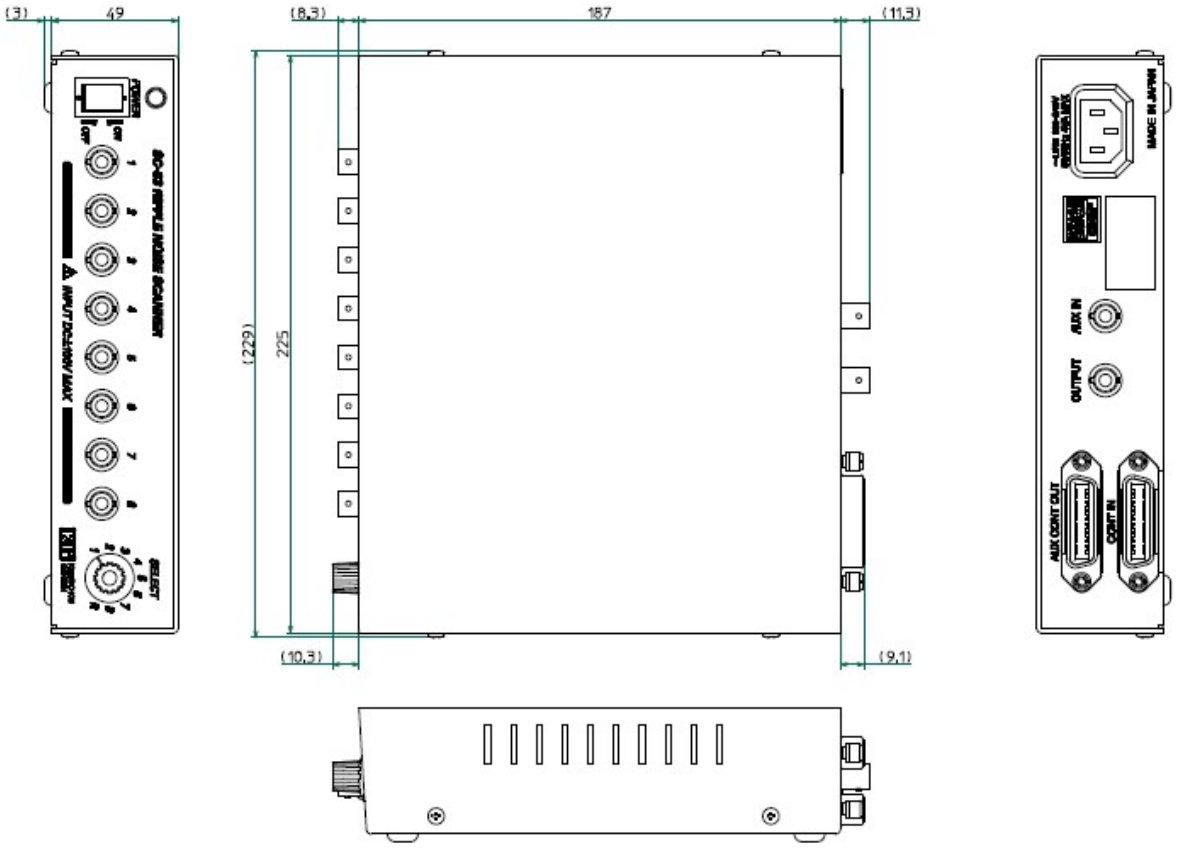
*1 External dimensions do not include protrusions (connectors, switches, screws).

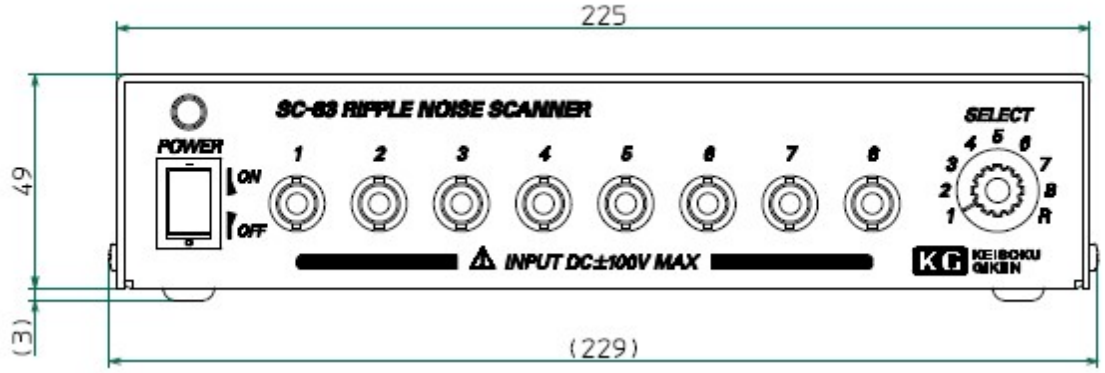
- Regarding the signal system, the cutting voltage is different from the old model SC-82.
- The external control section is compatible with the old model SC-82.

2) Internal configuration

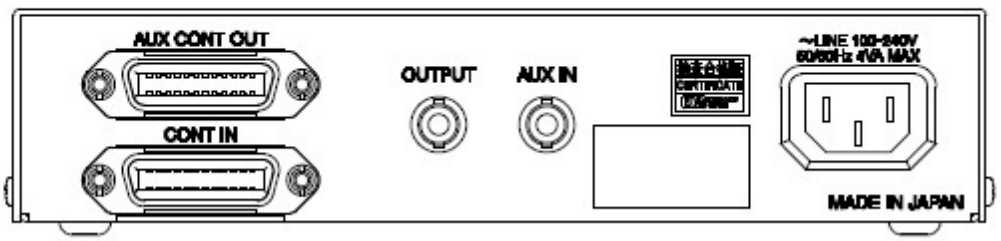


3) External dimensional drawing





FRONT PANEL



REAR PANEL

SC-83
Ripple Noise Scanner
Operation Manual

M-2531-02
Rev1.2

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Ripple Noise Scanner

Operation Manual

M-2531-02 Rev. 1.2

Ripple Noise Scanner

SC-83

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